Managing the White Space: Non-contiguous Operations and the Operational Control Structure

A Monograph
by
Major Matthew W. Zajac

United States Army
School of Advanced Military Studies

United States Army Command and General Staff College
Fort Leavenworth, Kansas

AY 03-04

SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

Major Matthew W. Zajac

Title of Monograph: Managing the White Space: Non-contiguous Operations and the Operational Control Structure

Approved by:

_____
John L. Garrett, LTC, IN — Monograph Director

_____
Kevin C.M. Benson, COL, AR — Director, School of Advanced Military Studies

_____
Robert K. Baumann, Ph.D. — Director, Graduate Degree Programs

Accepted this 8th Day of April 2004

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
26 MAY 2004		**-**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Managing the white space: non-contiguous operations and the operational control structure	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
Matthew Zajac	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
US Army School for Advanced Military Studies,250 Gibbon Ave,Fort Leavenworth,KS,66027	**ATZL-SWV**
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

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15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**1**	**55**	

ABSTRACT

"Managing the White Space: Non-contiguous Operations and the Operational Control Structure" by Major Matthew W. Zajac, Engineer, 45 pages.

This monograph examines the problem created for control when changes occur to the operational capabilities that enable non-contiguous operations. The problem exists because an operational control structure optimized for non-contiguous operations possesses an inherent control gap since a tactical control node capable of executing tasks in the battlespace retained by the operational command does not exist. The operational control structures in both Operation Enduring Freedom and Operation Iraqi Freedom faced this challenge. The control problem is examined by investigating how changes in operational capabilities force the operational command to change the methods by which it achieves its doctrinal tasks. Changing its methods creates tactical requirements to overcome the terrain in the previously unused, or "white", space between subordinate units. A doctrinally ineffective control structure results when the operational control structure attempts to execute these new tactical tasks without changing its structure. Thus, changing capabilities during non-contiguous operations may indicate that the operational control structure should be adjusted. This monograph recommends that operational planners conducting non-contiguous operations integrate the concept of an operational control structure transition point into their campaign plan and base the transition criteria upon changes to the capabilities that enable the conduct of operational tasks during non-contiguous operations.

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INTRODUCTION

Command and control are critical components of a force's ability to successfully execute its assigned missions. "As an element of control, *structure* is a defined organization that establishes relationships among its elements or a procedure that establishes relationships among its activities."[1] During Operation Enduring Freedom in Afghanistan, the operational commander conducted non-contiguous operations for a relatively long period without adjusting the initial operational control structure. The operational control structure and battlespace organization designed for the Combined Joint Task Force (CJTF) reflected the commander's focus towards supporting subordinate commands within their assigned areas of operation and their conduct of decisive combat operations. The CJTF headquarters initially exercised control over a land component commander, a joint special operations command, a civil-military operations command and a joint logistics command. Each of these subordinate elements had their own, often changing, designated areas of operations. A traditional rear-area control structure to manage operations between the subordinate unit's areas of operation was not established. It was a conscious decision to not include functional command and control nodes (i.e. traditional theater and corps level nodes) in the structure of the operational organization. In other words, the CJTF's initial control structure did not facilitate executing operational tasks requiring tactical command and control in the "white space" between the component commands' areas of operations and the CJTF's external boundary. However, corps and theater assets did operate within the CJTF's area of operation. As long as their operations coincided in time and space with

[1] Department of the Army, Field Manual 6-0, *Mission Command: Command and Control of Army Forces*, (Government Printing Office: Washington, D.C., June 2001), 1-5.

a subordinate command's operation the solution was simple – assign those forces to the subordinate command. Yet over time, corps and theater assets began operating within the "white space" between subordinate commands' areas of operation. These operational assets also pursued missions that had no relation to the missions of any of the subordinate commands. This situation evolved over time as friendly capabilities changed and the CJTF could no longer ignore the characteristics of the terrain in its white space. Due to the organizational structure of the CJTF, this required the CJTF, an operational level organization, to execute tactical tasks that it was not organized for and unprepared to effectively execute.

Operation Enduring Freedom in Afghanistan seems to validate some of the keystone concepts of the current transformation tenets, particularly with respect to conducting rapid decisive operations with technologically-enhanced smaller forces. Similarly, the operational control structure developed for combat operations in Afghanistan reflects current trends towards flattening control structures, i.e., eliminating intermediate headquarters and separate functional nodes. However, an operational control structure optimized to conduct short term, non-contiguous decisive operations is not optimized for performing a wider range of operations throughout the entirety of its battlespace. Once the impact of the terrain in the operational white space becomes a concern, a control structure optimized for non-contiguous operations becomes ineffective. Thus, an implied task is that if the conditions within an operational command's battlespace evolve then that command's control structure should evolve as well. This lesson from the operation in Afghanistan seems to get less attention and thus it is the challenge examined in this monograph.

This monograph proposes that one reason that adjustments to the operational control structure in Afghanistan were not implemented, or implemented slowly, is that doctrinal criteria identifying the approach of an operational control structure transition point do not exist. Therefore, the linkage between the operational organization of battlespace, changing conditions within that battlespace, and the requirement to adjust the structure of the control organization

deserves examination. This issue is increasingly relevant today since redesigning our current control structures is a component of ongoing transformation studies. This monograph examines this doctrinal gap by asking the question "What changing capabilities during non-contiguous operations indicate that the operational control structure should change?"

METHODOLOGY

An operational commander's understanding of his battlespace and his mission are the links between the control structure established and the partitioning of the area of operations. If one assumes that an operational commander's mission does not change, then it is reasonable to state that if significant changes in the battlespace occur (and are recognized and understood) then a commander will adjust the organization of the area of operations and / or the control structure. This monograph will examine one part of the three-way inter-relationship between battlespace, the arrangement of the area of operations, and the operational control structure. This examination is accomplished by holding constant the partitioning of the area of operations into non-contiguous areas. The "white space" then is that area between the operational command's subordinate units and the operational command's external boundary. This spatial arrangement also implies that the operational commander does not expect to execute tactical tasks to address terrain characteristics in the "white space". If creating a contiguous area of operations is not an option, significant changes in the commander's capabilities may force him to execute tactical tasks to address terrain characteristics within the white space. This will introduce organizational ineffectiveness which requires the commander to adjust his control structure. The question then becomes the thesis of this paper, i.e. "What changing capabilities during non-contiguous operations indicate that the operational control structure should change?" These changes can then be viewed as indicators for an operational transition point – namely the restructuring of the operational control structure during non-contiguous operations.

Analyzing the interplay between the operational control structure, battlespace

organization, and the conditions pertaining to the terrain and friendly forces in the operational area of operation requires several approaches, particularly since the conduct of non-contiguous operations with a flattened control structure is a relatively recent phenomenon. Chapter II examines doctrine and Joint transformation studies to define the problem and build a methodology for determining when changing white space conditions create operational control structure challenges. Current joint and Army doctrine define the specific terms relevant to this paper, namely battlespace and its relation to the criteria of terrain and friendly forces; non-contiguous and contiguous areas of operations; and the difference between operational control and tactical control. Next, how the inter-relationship of these factors causes the basic operational control structure problem is presented. Criteria are then developed for determining when the organization of a control structure is becoming ineffective and hence adjustments should be made. These criteria are developed from current Army doctrine on command and control. Throughout the chapter, Joint and Army transformation studies clarify doctrinal definitions and provide insights as to how future control structures may evolve to meet changing conditions within their battlespace. The chapter concludes with the observation that while the ability to transition the organization of an operational control structure is recognized as a required capability for the future force, very little attention has been focused on this problem. Hence, this monograph fills a void in the existing research on a desired capability for the future military force.

Chapter III posits the variables that an operational staff can track and use to identify an approaching operational control structure transition point. These variables come from a comparison of the doctrinal tasks that an operational command must execute and the capabilities required to operate non-contiguously while disregarding the impact of the terrain in the white space. The singular challenge with these variables is that each friendly capability exists along a continuum. Further, the exact point upon each variable's continuum and the combination of variables' conditions that allows for non-contiguous operations is not doctrinally or academically

defined. Thus, an assumption is presented that establishes the rational for an operational command to partition its battlespace non-contiguously and not organize a control capability to execute tactical tasks within its white space. This assumption creates the basis for defining a starting condition of each battlespace variable. The conclusion of Chapter III summarizes the capabilities that support the conduct of non-contiguous operations with an operational control structure designed not to execute tactical tasks in its white space.

Chapter IV integrates lessons from recent operations and my own observations while serving as an XVIII Airborne Corps / CJTF-180 planner in Operation Enduring Freedom to explore the effects of changing conditions in each variable developed in Chapter III. Each variable's changes are then compared to the criteria developed in Chapter II which define an effective control organization. Those changes in variables that cause an operational control structure to execute tactical tasks simultaneously violate the established criteria. This then proves that the changing condition is driving the operational control structure to operate ineffectively. Changing the control structure then becomes imperative in order to return the organization to a doctrinally-based operating effectiveness. Conclusions can then be drawn about which shifts in variables warrant re-examining the operational control structure thus answering the thesis question. Reliance upon this approach though must be tempered to supporting general conclusions in this monograph since the events under examination are still too recent to allow for definitive conclusions.

Finally, Chapter V recommends that operational staffs integrate the idea of an operational control transition point into their plans and adopt the variables presented as the indicators for determining the status of their need to evolve the operational control structure.

CHAPTER TWO: DEFINING THE PROBLEM

DOCTRINE AND THE BASIC PROBLEM

Several concepts need to be examined before stating the basic problem and focusing on the specific criteria being used to identify when the problem begins to emerge. These concepts are *battlespace, contiguous and non-contiguous areas of operation, operational command and control* and *tactical command and control*. The primary DoD agency in charge of transformation at the operational level is the Joint Vision and Transformation Division, Joint Staff/J7. Their concentration is on the joint task force and its future role in the operational level of war, seen as the "integrating joint force focal point".[2] Therefore, definitions derived from joint doctrine and ongoing transformation studies will be used in this paper. Army specific, and thus land-centric, definitions are presented where joint definitions are not available or to clarify the joint terminology.

Battlespace

The 2002 *Department of Defense Dictionary of Military and Associated Terms* defines battlespace as the "environment, factors, and conditions that must be understood to successfully apply combat power, protect the force, or complete the mission. This includes the air, land, sea, space, and the included enemy and friendly forces; facilities; weather; terrain; the electromagnetic spectrum; and the information environment within the operational areas and areas of interest."[3]. The June 2001 Army Field Manual 3-0 Operations further explains that while battlespace is

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[2] The Joint Staff / J7, *Concept for Future Joint Operations: Expanding Joint Vision 2010*, prepared by Commander, Joint Warfighting Center, May 1997, 4.

[3] Department of Defense, Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, (Government Printing Office: Washington, D.C., 23 March 1994), 53.

conceptual it includes the commander's area of operations and the surrounding area of influence, area of interest, any force projection bases, his home station and the information environment. This is clearly a complex set of intertwined variables that a commander must consider when creating his operational command and control structure.[4] To focus the research of this paper, only the battlespace variables of terrain, friendly forces and the commander's area of operations will be examined. This focus then requires one further spotlight and that is aimed at how a commander may sub-divide his area of operations.

Contiguous and Non-contiguous Areas of Operation

In January of 2003, the Joint Vision and Transformation Division published *An Evolving Joint Perspective: US Joint Warfare and Crisis Resolution in the 21st Century*. Approved by the Vice Chairman of the Joint Chiefs of Staff, this document is the "common frame of reference for future joint concept development…to transform the joint force…". [5] One of the evolving shifts in the conduct of joint, and hence operational level warfare, is stated as a shift from dividing the area of operations contiguously to non-contiguously.[6] Contiguous operations are defined as operations in one continual area of operations or a continuous forward line of troops.[7] In contrast, non-contiguous operations are operations conducted simultaneously from dispersed areas of operations networked with a shared picture and directed from an adaptive joint command and

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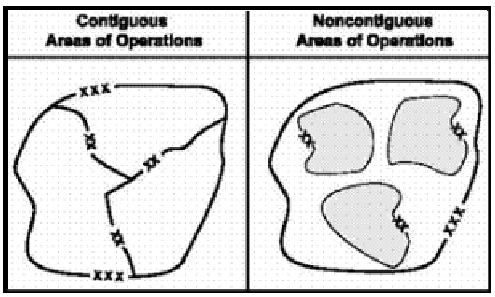
[4] Department of the Army, FM 3-0, *Operations*, (Government Printing Office: Washington, D.C., June 2001), 1-5.

[5] The Joint Staff / J7. *An Evolving Joint Perspective: US Joint Warfare and Crisis Resolution in the 21st Century*, prepared by Joint Chiefs of Staff, Directorate of Management Printing Office, 28 January 2003, iii.

[6] Ibid., 6.

[7] Ibid., 39.

control element.[8] The figure at right is from Army Field Manual 3-0 *Operations* and it graphically displays the difference between non-continuous and contiguous operations. Field Manual 3-0 further emphasizes that "the higher headquarters is responsible for the area between non-contiguous areas of operations.".[9] This last statement is critical to this monograph as it is the operational challenges of managing this "white space" between subordinate commands' non-contiguous areas of operation that concern us. A simple solution to this problem is for an operational commander to eliminate this "white space" by dividing his area of operations contiguously. However, the assumption that in the future this will not always be preferred, or feasible, is validated the fact that the current joint transformation studies propose that non-contiguous operations will be the norm in the 21st century.[10] This justifies examining the potential challenges of an operational control structure attempting to reconcile changing capabilities with the requirement to continue executing its doctrinal operational tasks.



Operational and Tactical Command and Control

The last two doctrinal concepts that require examination are those of command and control at the operational level and command and control at the tactical level. The operational level commander is concerned with "the use of military forces to achieve strategic goals through the design, organization, integration, and conduct of strategies, campaigns, major operations, and

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[8] Ibid., 39.

[9] Department of the Army, Field Manual 3-0, *Operations*, 4-20.

[10] The Joint Staff / J7. *An Evolving Joint Perspective: US Joint Warfare and Crisis Resolution in the 21st Century*, 6.

battles."[11] In contrast, the tactical commander focuses on the "ordered arrangement and maneuver of units in relation to each other and/or to the adversary in order to use their full potential."[12] The 1997 *Concept for Future Joint Operations*, a clarification of *Joint Vision 2010*, articulates this difference using the Observe-Orient-Decide-Act (OODA) Loop analogy. The operational level commander Observes what is occurring in his battlespace, Orients upon timely and relevant information, then Decides upon a response. This decision is translated into intents and orders, which are sent "quickly throughout the joint force so that various components can Act."[13] One goal of transformation studies is to determine how to structurally enable the most effective Decide-Act transition. A popular answer has been to flatten control structures, in effect tailoring the structure to achieve the immediate task at hand. While flattening may be the answer for a singular task, flattening limits the flexibility to effectively respond to significant battlespace changes.

The key point is that theoretically the tactical level control structure is responsible for acting, not the operational level control structure. In reality, the operational and tactical levels blend. Joint Publication 5-00.2 Joint Task Force Planning Guidance and Procedures recognizes this. The joint publication states that while the JTF by its nature is an operational-level force, depending upon the nature of the mission and the political and multinational considerations involved, the JTF may also conduct operations at the strategic or tactical levels as necessary.[14] In terms of control structure, this has previously been achieved by adding functional commands and

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[11] Joint Chiefs of Staff. Joint Pub 3-0, *Doctrine for Joint Operations*, (Government Printing Office, Washington, D.C., September 2001), II-2.

[12] Ibid., II-3.

[13] The Joint Staff / J7. *Concept for Future Joint Operations: Expanding Joint Vision 2010*, 67.

[14] Joint Chiefs of Staff. Joint Publication 5-002, *Joint Task Force (JTF) Planning Guidance and Procedures.* (Government Printing Office: Washington, D.C., 13 January 1999), VII-13.

assigning the functional commander responsibilities and an area of battlespace outside of the other subordinate component commands' areas of responsibility – in the linear framework within the rear or deep areas. When the area of operations is divided contiguously among subordinate tactical commands, which are in turn supported by functional commands, the operational control structure has a relatively simple job in deciding what forces should be assigned to what subordinate command. Such an arrangement allows the subordinate tactical commander to control operations while the operational commander supports the operation with forces and resources. However, if the area of operations is divided non-contiguously, and the operational headquarters retains the white space between its functional and component units, then determining how to execute tactical tasks within this area becomes problematical. The obvious solution is to fundamentally alter the operational control structure so that it is capable of executing the entire OODA cycle independently. While this is perhaps the goal of current advocates of flattening the existing control structure, the J7 states that future operational control structures will not be able to execute all tactical tasks in the future, even if the OODA Decide-Act link does become particularly seamless.[15]

The Problem

The basic problem lies within the relationship between organization and command. "Command is the authority that a commander in the military service lawfully exercises over subordinates by virtue of rank or assignment. Command includes the authority and responsibility for effectively using available resources for planning the employment of, organizing, directing, coordinating, and controlling military forces for the accomplishment of assigned missions."[16]

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[15] The Joint Staff / J7. *Concept for Future Joint Operations: Expanding Joint Vision 2010*, 67.

[16] Department of the Army, FM 6-0, *Mission Command: Command and Control of Army Forces*, 2-2.

Command provides a military force with purpose and direction, it tells subordinates what to do. Organization imparts shape and structure to the military force; it is the means of command. Organization determines who gets told and in how efficiently a manner.[17] "Structure also determines interactions among the elements of the organization, whether units or individuals. The effects of these interactions affect collecting, disseminating, and processing information."[18] A theoretical basis of dividing the operational area of operations into non-contiguous subordinate areas is that tactical actions are not required in the unassigned white space. In other words, there should theoretically not be anything for the operational commander to tell a subordinate commander to execute. Yet changes in the capabilities of friendly forces may cause operational tasks to be executed differently. In particular, the terrain of the white space may now significantly impact how effectively operational tasks are executed. Most likely, some tactical tasks will have to be executed in the white space to overcome the effects of the terrain. The problem is that an operational organization built to execute missions in a non-contiguous manner inherently has an organizational control gap. The gap may not be a problem if operations are completed and the military forces depart relatively quickly. The gap does become a problem when three circumstances simultaneously converge. The first circumstance is that the original control structure remains in place. The second circumstance is that friendly conditions change and overcoming terrain challenges within the operational white space requires repeated tactical responses. The last circumstance is the operational commander can not chose to eliminate the white space. The problem emerges now because since there is no subordinate command assigned responsibility for the white space, the operational command and control node (i.e., the JTF staff)

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[17] James J. Schneider, Class notes, *Cybernetic Domain*, SAMS Course, September 2003.

[18] Department of the Army, FM 6-0, *Mission Command: Command and Control of Army Forces*, 3-6.

can only tell itself to execute those tasks. Executing those tactical tasks then causes the operational control structure to violate the doctrinal principles of an effective organization.

DEFINING AN EFFECTIVE COMMAND AND CONTROL ORGANIZATION

While an operational control structure can execute some short-term tactical tasks, attempting to execute multiple tasks over a long period becomes problematical. Why does the execution of tactical tasks in response to changing conditions in the white space cause problems for the existing operational control organization? The problem occurs primarily because the operational control organization lacks two basic capabilities that were recognized as early as 1931. One of the earliest theorists on operational art, Mikhail Tukhachevsky, stated that there are two critical differences between an operational headquarters and a tactical headquarters.[19] The first difference is that while strategic transport is available to an operational headquarters, it lacks an organic tactical transport capability. This means that an operational headquarters is incapable of tactically moving forces throughout the battlespace and must rely upon the assets of its subordinate commands to do so. The second critical difference is that an operational headquarters' logistic support is drawn from its subordinate assets and thus any tactical actions carried out by an operational headquarters must rely upon a subordinate unit for support. Clearly, this distracts the subordinate's logistical element from its primary mission of supporting the mission of its own tactical headquarters' forces.

When an operational control organization attempts to execute tactical tasks it must rectify these capability shortfalls which invariably cause it to function less effectively. One means of measuring the effectiveness of a control organization is to compare how well the organizational structure supports the doctrinal principles of organization for command and control. Because a

Joint manual that defines what "effective" is for a command and control structure is not published, the principles presented in the recently released Field Manual 6.0 Mission Command: Command and Control of Army Forces are being used. These principles are: unity of command, reasonable spans of control, cohesive mission teams, and effective information distribution.[20] These four principles are the criteria against which changes in the capabilities to execute operational tasks will be compared against in order to determine which changing variables will result in an ineffective control structure. The criteria are doctrinally defined as follows:

Unity of Command – "Under unity of command, any mission falls within the authority and responsibility of a single, responsible commander. Commanders receive orders from only one superior, to whom they are accountable for accomplishing the mission."[21]

Span of Control – Span of control refers to "the number of subordinates or activities under a single commander."[22] Field Manual 6-0 also states that while the span of control varies with the situation, commanders can effectively command two to five subordinates.

Unit Integrity – Unit integrity creates familiarity and stable working relationships that allow self-reliant subordinate commands to act semi-autonomously. There are two imperatives for maintaining unit integrity:

(1) Task organize forces based on standing headquarters, their assigned forces, and habitually associated slice elements. Where this is not feasible and ad hoc organizations are formed, allow time for training and establishing functional working relationships and procedures.

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[19] Mikhail Tukhachevesky, *New Problems in Warfare*. (SAMS Reprint, School of Advanced Military Studies, United States Army Command and General Staff College: Fort Leavenworth, Kansas, undated), 63.

[20] Department of the Army, FM 6-0, *Mission Command: Command and Control of Army Forces*, 5-23.

[21] Ibid., 2-8.

[22] Ibid., 5-24.

(2) Once a force is task organized and committed, do not change the task organization during operations unless the benefits clearly outweigh the disadvantages. Reorganizations cost time, effort, and tempo.[23]

Effective Information Distribution – While Field Manual 6.0 states that information distribution is one of the principles of an effective command and control structure, nowhere does the manual define this term. Therefore, the definition used for this criterion is that the control structure does not create barriers between those who collect the information and those who must use the information.

The four criteria provide a means of linking operational capability changes that require a tactical response to terrain challenges in the white space to the generation of control structure inefficiencies. Change is then required to recreate an effective operational control structure. Thus we can use these four criteria to examine when changing operational capabilities should indicate that the control structure should change.

SUMMARIZING THE PROBLEM

Understanding the difference in command and control at the operational and tactical levels is fundamental to understanding the challenge that an operational control structure has in managing tactical requirements in its white space. Arguably, this situation can be avoided by properly spatially aligning forces; by designing an appropriate operational control structure before entering the area of operations; and/or by rapidly accomplishing the mission and departing before unforeseen changes within the operational battlespace occur. Certainly this is what the commander and staff believed had been done when CJTF-180 assumed command in Afghanistan. Yet the CJTF remained in Afghanistan for a significant period of time during which changes in its

[23] Ibid., 5-25.

capabilities required it to overcome challenges in the terrain of its white space in order to execute its operational tasks. These tactical responses challenged the abilities of the initial operational control structure and reduced its effectiveness. Further, while transformation studies recognize that operational forces of the future will still have to enter a transition phase in order to prepare for follow-on operations,[24] to ability to transition the organization of an operational control structure during an operation in response to changing capabilities has not received much attention. This monograph integrates observations from recent non-contiguous operations to examine what changing capabilities may serve as indicators that change in the control structure is needed. Recognizing that changes in capabilities are forcing the operational command to neutralize the effects of the terrain in his white space is what this monograph proposes equates to recognizing the approach of a transition point. The transition itself is the changing of the structure of the operational control organization. What remains is to identify the variables that an operational level staff can use to validate that it is time to consider changing the control structure.

[24] The Joint Staff / J7. *Concept for Future Joint Operations: Expanding Joint Vision 2010*, 70.

CHAPTER THREE: TERRAIN, CAPABILITIES AND OPERATIONAL TASKS

INTRODUCTION

As stated in chapter two, changing conditions within an operational commander's area of operations should impact upon a commander's decision to adjust his control structure. This chapter examines the doctrinal tasks that an operational control node must execute and derives the capabilities that enable the conduct of non-contiguous operations. These capabilities then become the variables which can be changed to examine how the operational command's dependence upon the terrain of the white space changes. Historical examples should then suggest when an operational control structure has to begin executing tactical tasks in its previously empty white space to address the change in its capabilities. While the purpose of this monograph is not to propose the exact combination of changes that will drive an operational control structure to change, this chapter will provide a series of capabilities-based variables to track as indicators that the operational control structure may need to evolve.

An assumption will now be made about the initial condition of the operational commander's white space. This assumption is that the commitment of forces executing tactical tasks outside of subordinate commands' areas of operation is not necessary. This is not to imply that the operational commander is not concerned with activities within his white space but simply that the operational control structure is not executing tactical tasks in that area. The operational command may even be dependant upon the success of actions that occur within this white space. As an example, although the CJTF in Afghanistan did not designate main supply routes through the white space between its subordinate unit's areas of operation, the CJTF was dependant upon the successful ground flow of supplies through its white space by the CJTF's contracted logisticians. This assumption generates a base condition for each variable from which change

can be measured against. Chapter IV then applies historical examples to each variable's starting condition to demonstrate how its change leads to a new relationship with the terrain in the white space and the generation of tactical tasks. Executing these tactical tasks then causes the operational control structure to operate inefficiently which should cause that control structure to change.

THE OPERATIONAL IMPACT OF TERRAIN

Clausewitz wrote that "the relationship between warfare and terrain …is a permanent factor…for it affects the operations of all forces, and at times entirely alters them."[25] It is important to remember that terrain is neutral and its effect upon operations is purely relative to the need to operate in its specific set of conditions. Dr. Schneider states that at the operational level, terrain effects operations by degrading attrition, impeding mobility and movement, and limiting deployment.[26] Since our assumption states that the operational command is not controlling forces executing tactical tasks in its white space, we can conclude that degrading attrition is not a characteristic of the terrain whose change would reduce the effectiveness of the operational control structure. However, in shaping the fight for its subordinate commands, how the terrain impedes mobility and limits deployment options remains critical. The terrain limits deployment options and impedes mobility either because of its inherent natural condition or because of the condition of man-made modifications. Therefore, in order for an operational control structure to be able to disregard the effects of the terrain in its white space, it must have a capability that negates the effects of the terrain on each of its operational tasks.

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[25] Carl von Clausewitz, On War, ed. and trans., Michael Howard and Peter Paret (Princeton: Princeton University Press, 1989), 109.

[26] James J. Schneider, *Theoretical Paper No. 3: The Theory of Operational Art*, (School of Advanced Military Studies, United States Army Command and General Staff College, Fort Leavenworth, Kansas, 1988), 25.

OPERATIONAL TASKS

The Universal Joint Task List (UJTL) lists seven tasks that an operational command must be capable of executing. These tasks are:

OP1 Conduct Operational Movement and Maneuver

OP2 Provide Operational Intelligence, Surveillance and Reconnaissance

OP3 Employ Operational Firepower

OP4 Provide Operational Logistics and Personnel Support

OP5 Provide Operational Command and Control

OP6 Provide Operational Force Protection

OP7 Counter CBRNE Weapons in JOA[27]

A doctrinal relationship between OP5 and the other operational tasks is interesting to note. Nowhere in the subtasks for Provide Operational Command and Control is a task referring to a desired ability to change the control structure because of changing battlespace conditions. Further, under the sub-task OP 5.5.1 Develop a Joint Force Command and Control Structure, measures of effectiveness M16 and M17 imply that it is negative to have incidents of modifying the command structure during mission execution.[28] These observations further support the statement in Chapter I that there is currently no widespread recognition of the need to doctrinally define transition criteria for changing the operational control structure.

This monograph is in effect examining the relationship between task OP5 and the other six tasks. Tasks OP1, OP2, OP4 and OP6 are all tasks which the operational control structure manages in order to set conditions for the success of its subordinate commands. These tasks also

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[27] Joint Chiefs of Staff. Chairman of the Joint Chief of Staff Manual (CJCSM) 3500.04C,*Universal Joint Task List*, (Government Printing Office: Washington, D.C., 1 July 2002), B-C-C-1 to 9.

[28] Ibid., B-C-C-117.

traditionally occur outside of subordinate commands' areas of operation in the linearly defined rear or deep areas. In non-contiguous operations the operational white space is the spatial equivalent of simultaneously existing and overlapping rear and deep areas. Therefore, the capabilities that allow a non-contiguous control structure (which is a method of executing task OP5) to ignore the effects of the terrain in its white space and still execute these tasks provides a valid starting point for identifying indicators for a control structure transition point. Because OP3 and OP7 refer to tasks that the operational command has sole responsibility for, and could execute anywhere within the operational area of operations, the impact of the terrain in the operational white space upon their execution will not be examined.

Operational Task 1 Conduct Operational Movement and Maneuver "includes moving or deploying forces for operational advantage within a joint operations area and conducting maneuver to operational depths.".[29] Retired Army Brigadier General Huba Wass de Czege expands upon this definition when he states that operational maneuver "includes favorable positioning in time and place to either deter or preempt enemy plans and intentions, as well as locating forces so that air, ground and sea operations may be launched most advantageously. Such maneuver must also achieve a momentum that not only permits rapid seizure of the initiative, but also never relinquishes it."[30] An operational control structure's ability to execute this task while ignoring the effects of the terrain in its white space is uniquely tied to the type of transport platforms available. Since the assumption is that neither man-made nor natural terrain characteristics are affecting this operational task, the only logical starting capability is that operational movement and maneuver can be accomplished using only aerial platforms. This is not unrealistic as operations in Afghanistan initially relied upon only rotary or fixed wing

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[29] Ibid., B-C-C-9.

[30] Huba Wass de Czege, "Wargaming Insights." *Army*, Vol. 53, No. 3 (March 2003): 39.

transport to position and move subordinate commands. A further condition is that the aerial platforms have the technical capability to fly from one subordinate command's area of operations to another without requiring support from an intermediate, terrestrial location located within the operational command's white space. The variable that emerges from OP1 then is an aerial transport capability. The variable's starting condition is that sufficient assets exist to conduct all required operational movements or maneuvers and the transport platforms require no support locations between subordinate commands.

Operational Task 2 Provide Operational Intelligence, Surveillance and Reconnaissance (ISR) "produces the intelligence required to accomplish objectives within a joint operations area".[31] An operational control structure's ability to execute this task while ignoring the effects of the terrain in its white space rests upon three conditions. First, the collection capability is not degraded by the characteristics of the terrain. Second, the collection capability is able to rapidly change its focus from one position to another across the entire span of the operational white space. Finally, the collection capability must be able to operate continuously without drawing support from the area within the white space. Only one existing capability currently even approaches meeting all of these requirements – that of the operational command's aerial and space-based surveillance sensors. This capability is viewed as essential to an operational command's ability to both protect the force as well conduct non-contiguous operations. The "larger issue for Future Command System (FCS) survivability is the current assumption that very high levels of situational awareness can be achieved in all terrain types….If FCS-armed units cannot achieve what by today's standards are extremely high levels of situational awareness, they

[31] Joint Chiefs of Staff, Chairman of the Joint Chief of Staff Manual (CJCSM) 3500.04C,*Universal Joint Task List*, B-C-C-33.

will be at considerable risk."[32] The operational commander must continuously know what is happening in his white space in order to ensure that his other six operational tasks are effectively setting the conditions for the success of his subordinate commands. This was demonstrated in Afghanistan where the "approach relies first on surveillance sensors—thermal images, Predator reconnaissance drones, even satellites—to locate the enemy. In the next step, U.S. ground forces hold the enemy in place, but at a bit of a distance. Finally, bombs or artillery—not infantrymen—are often used to finish off the foe. Straining the capacity of military helicopters, U.S. commanders have airlifted troops to 10,000-foot-high ridges, then had them work their way down, using data gleaned by sensors to pin down enemy fighters."[33] The variable that emerges from OP2 then is an aerial sensor capability. The variable's starting condition is that the sensor must be effective enough to support continuous situational awareness in all of the types of terrain in the operational white space.

Operational Task 4 Provide Operational Logistics and Personnel Support provides "logistics and personnel support activities required to sustain the force in campaigns and major operations within the joint operations area."[34] An operational control structure's ability to execute this task while ignoring the effects of the terrain in its white space is tied to its capability to deliver sustainment to the subordinate commands in the joint operational area. This capability must be able to bypass any terrain restriction that exists in the operational white space. Two capabilities are currently reliable in achieving this. The first is the use of aerial delivery methods.

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[32] Peter A. Wilson, John Gordon, and David E. Johnson. "An Alternative Future Force: Building a Better Army." US Army War College, *Parameters* (Winter 2003-4): 27.

[33] Thomas E. Ricks and Bradley Graham. "Surprises, Adjustments, and Milestones for U.S. Military: In Huge Battle, Regular Army Soldiers Met with Unexpected Al Qaeda Resistance," *Washington Post* (March 10, 2002): A26.

[34] Joint Chiefs of Staff, Chairman of the Joint Chief of Staff Manual (CJCSM) 3500.04C,*Universal Joint Task List*, B-C-C-71.

This capability has the same condition as that of the aerial platforms used for operational movement and maneuver. The second capability is to contract the delivery task, and thus the problem of overcoming terrain characteristics, to an agency outside of the operational command's control structure. While this solution was initially viewed with a great deal of skepticism, the results of contracting logistical support over the last decade have proven that contracting is increasingly reliable. Joint Publication 4.0 validates this when it states that the "emerging trend is to use contractors to augment active military combat service support and assist them in meeting major theater war or other mission requirements services."[35] Adding credence to this option is the fact that the J7's *An Evolving Joint Perspective* identifies "reducing the logistic footprint through…an increased use of contractors on the battlefield, host nation and multi-nation support" as an evolving shift towards 21st century warfare.[36] The key point though is that by contracting for the delivery of logistical support between its subordinate commands' areas of operation, an operational command can reduce, if not eliminate, the effects of the terrain in its white space upon logistical delivery. It does this by shifting the requirement to execute its tactical tasks to an external agency. The contracted agency then has the challenge of figuring out how to change the condition of the terrain hindering the delivery of logistical support. Two variables thus emerge from OP4. The first variable is an aerial delivery capability. Similar to the OP1 variable, the aerial delivery capability's starting condition is that sufficient assets exist to conduct all required logistical support and the transport platforms require no support locations between subordinate commands. The second variable is the capability to contract for logistic delivery. The starting condition for this contracted logistic delivery is simply that it accomplishes its delivery task.

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[35] Joint Chiefs of Staff. Joint Publication 4-0, *Doctrine for Logistic Support of Joint Operations*, (US Government Printing Office, Washington, D.C., 6 April 2000), I-15.

[36] The Joint Staff / J7. *An Evolving Joint Perspective: US Joint Warfare and Crisis Resolution in the 21st Century*, 40.

The last operational task, OP6 Provide Operational Force Protection, conserves "the force's fighting potential so that it can be applied at the decisive time and place."[37] This is a wide ranging operational task that includes 46 sub-tasks. Because of its scope, only two subordinate tasks that relate directly to the characteristics of the terrain in the joint operational area will be examined. The first sub-task is the requirement to remove operationally significant hazards. Since the specific term "operationally significant hazards" does not have a joint definition, the more general term "occupational and environmental health threats" will be used. Occupational and environmental health threats are defined by the Department of Defense as "threats to the health of military personnel and to military readiness created by exposure to hazardous agents, environmental contamination, or toxic industrial materials."[38] The second sub-task is the requirement to conduct countermine activities. This requirement is defined as being able to "conduct countermine activities to reduce or eliminate the threat to noncombatants and friendly military forces posed by mines, boobytraps, and other explosive devices by training Host Nation forces in the location, recognition, and safe disposal of mines and other destructive devices, as well as countermine program management."[39] An operational control structure's ability to execute these tasks while ignoring the effects of the terrain in its white space is tied to its capability to quickly neutralize the threat posed by the operational hazard or mines. The capability to quickly neutralize these threats to force protection however requires two conditions. The first condition is that a capable and trained group is available to address the situation. The second condition is that the scope of the problem, with respect to its physical dimensions, lends

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[37] Joint Chiefs of Staff, Chairman of the Joint Chief of Staff Manual (CJCSM) 3500.04C,*Universal Joint Task List*, B-C-C-130.

[38] Joint Chiefs of Staff. Joint Publication 4-0.2 *Doctrine for Health Service Support in Joint Operations*, (Government Printing Office: Washington, D.C., 30 July 2001), GL-7.

[39] Joint Chiefs of Staff. Chairman of the Joint Chief of Staff Manual (CJCSM) 3500.04C,*Universal Joint Task List*, p. B-C-C-144.

itself to rapid resolution. Unfortunately experience proves that these conditions are the exception rather than the rule. Almost any environmental hazard requires physically extensive remediation efforts that take a considerable length of time. Likewise, demining is a relatively slow process even with a sizable capability available.

SUMMATION OF CAPABILITIES-BASED VARIABLES

If an operational command is executing non-contiguous operations, then the white space between its subordinate commands remains under its control. This implies that the control structure can execute its operational tasks without the terrain in its white space affecting its ability to perform those tasks. This means that the operational control structure has certain capabilities available that negate the effects of the terrain in its white space. Conversely, if these capabilities are lost then the operational control structure will have to change the terrain to eliminate its effects. Changing the terrain itself will require the execution of tactical tasks by the operational control structure. This introduces inefficiencies to the operational control structure which may result in the control structure itself changing. Therefore, changes in the capabilities that the operational control structure relies upon to negate the effects of the terrain in its white space may indicate that a transition point in the operational control structure is approaching. The following table summarizes which capabilities, and their initial conditions, can be used as variables to measure the approach of an operational control transition point:

VARIABLE (CAPABILITY)	STARTING CONDITION(S)
Aerial Transport	1. Sufficient assets exist to conduct all required operational movements or maneuvers 2. The transport platforms require no support locations between subordinate commands
Aerial Sensors	1. Sensors are effective enough to support continuous situational awareness in all of the types of terrain in the operational white space
Aerial Logistics Delivery	1. Sufficient assets exist to conduct all required logistical support 2. Transport platforms require no support locations between subordinate commands
Contract for Logistic Delivery	1. Contracted support accomplishes its

	delivery task
Quickly Neutralize Operational Hazards and Mine Threats	1. Capable and trained group is available to address the situation 2. The physical scope of the problem lends itself to rapid resolution

Historical and theoretical examples can now be applied to each variable to validate whether changing the proposed starting conditions do in fact generate terrain-related tactical tasks. Applying the criteria for an effective control structure from Chapter II to the new situation confronting the operational control structure then confirms if organizational ineffectiveness has been generated. This identifies that a transition to a new control structure may be necessary.

CHAPTER FOUR: IMPACT OF CHANGING CAPABILITIES ON THE CONTROL STRUCTURE

INTRODUCTION

Chapter III identified five capabilities that enable an operational commander to conduct non-contiguous operations without concerning himself with the effects of the terrain between his subordinate commands. In this chapter, each variable's condition is degraded to examine whether the terrain in the operational commander's white space now presents a challenge which may require a tactical task to overcome. If a tactical task is required, the operational control structure must then incorporate the assets conducting the task. Using the criteria for defining an effective control structure from Chapter II, the change is judged to determine if it reduces the effectiveness of the control structure. If so, then the control structure should change. The last section of this chapter summarizes which changing capabilities are thus linked to a requirement to change the operational control structure.

AERIAL TRANSPORT

Aerial transport is the identified capability that allows an operational command to conduct operational movement and maneuver without organizing a control structure capable of executing tactical tasks within its white space. Two initial conditions were identified that define how an aerial transport capability overcomes the challenges of the terrain between subordinate commands. These conditions were (1) that sufficient assets are available to conduct all required operational movements or maneuvers, and (2) the transport platforms require no support locations between subordinate commands. How a change in each condition may cause the development of tactical tasks in the operational white space is examined next.

Asset Availability

If sufficient aerial transport assets to conduct all required operational movements or maneuvers are no longer available the operational command must conduct ground movements and maneuvers. The nature of the terrain in the white space now becomes a primary concern of the operational command because it will affect the tempo of operations if only because the time to complete the repositioning of a subordinate unit is increased. This alone will not cause a requirement to operationally execute tactical tasks within the white space. However, the platform itself now transitions from an operational / strategic asset to a tactical asset which the operational command must integrate into its control structure. A classic example is the operational movement of any airborne infantry unit once it has completed its parachute insertion. Moving airborne infantry then requires the use of transport assets which are not organic to that unit. A simple solution is to provide each unit that can't be operationally moved by aerial transport its own organic ground transport. Force caps and sustainment limitations though are likely to make this solution infeasible in all but the smallest operations. The only other option then is to control the ground transport asset at the operational level.

The second reason that a loss of sufficient aerial transport assets will create a requirement to execute tactical tasks within the white space is that the terrain itself may need to be re-shaped to accomplish the operational movement or maneuver. While current tactical units' posses a limited capability to shape the terrain to meet their needs, the majority of significant terrain shaping effort and expertise resides at the operational and strategic levels. Time plays a significant role in reshaping the terrain as well. Route clearance and infrastructure (i.e. bridges, culverts, etc.) rebuilding are tasks that take a significant amount of preparation and completion time. An operational command is unlikely to task a subordinate unit to prepare the terrain in the operational white space for a future movement while that unit is engaged in a current operation within its own area of operation. The operational command structure then has to integrate an

operational capability to execute these tactical tasks and monitor their execution over a period of time.

Platform Reach

The second initial condition that enabled aerial transport to support the operational execution of non-contiguous operations was that the transport platforms required no support locations between subordinate commands. If this condition changes then the aerial platforms will require a stop somewhere within the operational command's white space. This implies that a piece of terrain will have to be secured for a period of time and made suitable to support the aerial platform's replenishment. In relation to the operational control structure, the key component of this situation is time. For single or short-term resupply requirements with minimal terrain shaping, current doctrine addresses the use of forward area refueling points (FARPs) and other methods to resupply aerial platforms in the operational deep area where the operational command does not control the terrain. However, once the requirement to repeatedly use the same piece of terrain for aerial platform resupply emerges or a requirement to significantly reshape the terrain (repair or construct facilities) emerges then the operational command is faced with a need to physically manage a piece of terrain in its white space for a significant period of time. The necessity of managing this piece of terrain then drives the execution of tactical tasks to secure, maintain, and/or upgrade the terrain, among other tasks. Coordinating these diverse tactical tasks on this single piece of terrain for an extended period of time also now becomes an operational requirement.

Aerial Transport and the Operational Control Structure

The loss of sufficient aerial transport assets introduces requirements to add a ground transport capability and/or ability to reshape the terrain within the operational white space. Similarly, the loss of the ability of aerial platforms to reach between subordinate commands may

introduce the need to establish an intermediate resupply base between subordinate commands in the operational white space. Therefore, it is proven that a change in the initial conditions of aerial transport requires the operational control structure to execute tactical tasks within its white space in order to still accomplish its requirement to conduct operational movement and maneuver. But does this change generate inefficiencies in the operational control structure that will require changing the structure?

Adding a transport capability, a terrain shaping capability and/or the capabilities to operate an aerial platform resupply base within the white space for a relatively short period of time in order to accomplish an operational movement or maneuver will not violate the unity of command of the operational control structure. Each element added will still receive its orders from one commander - the operational commander. Unity of command may become an issue if the operational movement or maneuver generates a long-term requirement to operate an intermediate base to continuously resupply the aerial platforms being used. This begins to resemble a logistical support function and thus will be discussed in the section on changes to the operational command's aerial logistics delivery capability.

Likewise there is no inherent reason why adding these capabilities will create structural barriers between those who collect information and those who must use that information. Information distribution is not necessarily degraded.

The two measures of effectiveness for an operational control structure that will be affected by changes in the condition of aerial transport are the span of control and unit integrity. Any introduction of capabilities to the operational command structure in order to address white space tactical tasks will increase the span of control of the operational commander. Keeping in mind the doctrinal recommendation that the span of control remain between three-to-five subordinates, it is apparent that an operational commander is quickly overwhelmed by the addition of independent tactical capabilities to his operational control node. Finally, changes in the conditions of aerial transport will violate the principle of unit integrity. Each tactical

capability that the operational control structure retains forces it to create an ad hoc system to tactically manage and maintain that capability.

AERIAL SENSORS

Aerial sensors is the identified capability that allows an operational command to provide operational intelligence, surveillance and reconnaissance (ISR) without organizing a control structure capable of executing tactical tasks within its white space. This capability's initial condition is that the sensors are effective enough to support continuous situational awareness in all of the types of terrain in the operational white space. The singular loss of this capability may prevent an operational commander from conducting non-contiguous operations. This linkage between dominant surveillance and the conduct of non-contiguous operations is emphasized in a recent Military Review article examining the relationship between operations in Afghanistan, military theory and the future of war. The author observes that "the dominance of surveillance and strike means that…if an enemy can be remotely located, traditional movement to contact preceded by forward troops probing for the enemy will be replaced with well-prepared, deliberate, "deep" attacks using tactics that exploit rapid positioning for maximum effect."[40] It is also critical to note that this surveillance capability is fundamental to the envisioned future force's execution of operational task OP3 Employ Operational Firepower. Retired Brigadier General Huba Wass de Czege observes that "kinetic killing power is highly dependent on relevant knowledge" and that repeatedly war games show that while kinetic killing power is abundant, the loss or shortage of key enablers make it difficult to bring the potential kinetic power to bear on a target. [41] The potential success of this future concept was glimpsed in the real world where ISR

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[40] Michael Evans. "From Kadesh to Kandahar: Military Theory and the Future of War." US Naval War College, *Naval War College* Review, Vol. LVI, No. 3, (Summer 2003): 10.

[41] Huba Wass de Czege, 42.

persistence coupled with today's faster communication networks often reduced the time between detecting a target and destroying it to less than 20 minutes in Afghanistan.[42] Degrading aerial surveillance thus results in an area of terrain in the white space no longer being examined as effectively at the operational level because a portion of the operational capability to conduct ISR is negated. But technical sensors are not the only means available to the operational command to conduct ISR and even when available still have their limitations. Recent events in Afghanistan illustrate that to obtain persistent ISR requires an adaptive blend of both technical and human sensors.[43] Current doctrine also validates the necessity to integrate human teams with both ground and aerial sensors at the operational level. Thus, conducting operational ISR in an aerial sensor's blind area would most likely result in shifting collection from technical sensors to human sensors. This shift indicates the creation of a requirement to add, or increase the scope of, a tactical task to conduct human surveillance and reconnaissance in the white space to enable the operational requirement to conduct ISR.

Aerial Sensors and the Operational Control Structure

The loss of the ability to use aerial sensors to conduct operational ISR over an area of terrain introduces requirements to add or increase the use of human sensors. Therefore it is proven that a change in the initial condition of aerial sensors' effectiveness requires the operational control structure to execute tactical tasks within its white space in order to still accomplish its requirement to conduct operational ISR. However, this change is unlikely to generate inefficiencies in the operational control structure that will require changing the structure.

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[42] Michael E. O'Hanlon. "A Flawed Masterpiece." *Foreign Affairs*, Vol. 81, No. 3 (May/June 2002): 59.

[43] Department of the Army. TRADOC Pamphlet 525-3-0.1, *The United States Army Objective Force Battle Command (C4ISR) Concept, Concept Coordinating Draft*, prepared by US Army Training and Doctrine Command, Fort Monroe, Virginia, 31 October 2002, 62.

This is because the operational commander's primary tool for human ISR is already likely a subordinate command – his special operations task force – or a component of his operational intelligence cell. While limitations as to the amount of white space that can be covered by these assets may change the tempo of operations, the operational command still inherently has the control structure to conduct this tactical task in its white space. Thus, the size and/or the number of missions of these assets may increase but it is unlikely that shifting from aerial sensors to human sensors will reduce the effectiveness of the control structure's unity of command, information distribution, span of control, or unit integrity. Since the control structure's doctrinal measures of effectiveness are not reduced there is no reason to change the operational control structure.

AERIAL LOGISTICS DELIVERY

Aerial logistics delivery is the identified capability that allows an operational command to conduct operational logistics and personnel support without organizing a control structure capable of executing tactical tasks within its white space. Two initial conditions were identified that define how an aerial logistics delivery capability overcomes the challenges of the terrain between subordinate commands. These conditions were (1) that sufficient assets exist to conduct all required logistical support, and (2) the transport platforms require no support locations between subordinate commands. These conditions are very similar to the initial conditions that enable the operational capability to conduct movement and maneuver while ignoring the conditions of the terrain in its white space. How changes in each condition of aerial logistics delivery reflects that of the aerial transport capability, as well as what new tactical tasks may develop in the operational white space, is examined next.

Asset Availability

If sufficient aerial logistics assets to conduct all required operational logistics and

personnel support are no longer available the operational command must resort to over-land logistic resupply operations. Just as with the switch from aerial platforms to ground delivery assets in the conduct of operational movement and maneuver, the asset used to deliver sustainment switches from an operational / strategic asset to a tactical asset which the operational command must integrate into its control structure. However, the option to assign operational transport assets to a subordinate command permanently does not doctrinally exist since the conduct of operational delivery is fundamentally a push system, not a pull system. This leads to a requirement for the operational control structure to integrate these assets. This may be accomplished easily by assigning the ground transport assets to the existing subordinate operational logistics control node. But, that node must already exist and have a feasible ground route between itself and the other commands which it must logistically support. This becomes a problem if operating in a distributed manner as joint transformation documents posit.[44] In distributed operations, the operational logistics node is likely operating from a location detached in space from the subordinate commands' areas of operation and thus unable to physically transit the terrain in the operational white space between units if aerial assets are no longer available. In this case, a requirement to create a local operational control node to support ground delivery assets emerges in order to control the execution of new tactical tasks in the operational white space. This is in itself a change to the operational control structure.

As with the aerial transport capability, the nature of the terrain in the white space now becomes a primary concern of the operational command. Unlike with the conduct of operational movements or maneuvers, the tempo of operations may not be decreased but increased due to the ability to move greater amounts of support using ground assets relative to the capacity of air platforms. A potential increase in tempo is purely conditional upon the ability to regularly and

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[44] The Joint Staff / J7, *An Evolving Joint Perspective: US Joint Warfare and Crisis Resolution in the 21st Century*, 18.

with some measure of predetermined efficiency transit both the travel distance and overcome the condition of the terrain between the logistical starting point and the unit being delivered to. This brings up the most significant difference in how the terrain in the white space relates to operational logistics and personal support vice operational movement and maneuver. An operational movement or maneuver through a portion of the operational white space is a fixed event – its temporary nature lends itself to resorting to lesser-than-optimal solutions as long as the movement or maneuver can still be accomplished within the original plan's parameters. For example, if this requires moving along secondary roads instead of the primary highway because of the state of conditions along that highway then that is acceptable. Contrary to this, conducting operational logistics is a continuous event that causes logistics assets to transit the terrain of the white space regularly and, due to potential wear and tear on delivery assets, attempt to minimize the required distance repeatedly traveled. This leads to a greater necessity to invest time and resources into upgrading the infrastructure along logistical routes. Reshaping the terrain along these routes thus provides a much greater payback to the operational commander then doing so for an operational movement or maneuver, particularly if the loss of aerial logistics delivery assets is expected to be a long-term condition. Continued logistical operations through the operational white space also increases the operational risk associated with sustainment operations as the threat's ability to interfere with operational logistics increases. Whereas subordinate units conducting an operational movement or maneuver through the white space are relatively more capable in protecting themselves than operational logistics assets, this generates a requirement to provide a tactical security capability for logistical operations within portions of the white space. As with the loss of aerial assets to conduct operational movement and maneuver, the operational command structure now has to integrate an operational capability to execute tactical terrain shaping tasks and monitor their execution over a long period of time. Additionally, the operational command now has a requirement to integrate tactical security tasks for its operational logistics operations to succeed in the white space.

Platform Reach

The second initial condition that enabled aerial logistics delivery to support the operational execution of non-contiguous operations was that the transport platforms required no support locations between subordinate commands. Just as with the change of the same condition for operational movement and maneuver, if this condition changes then the aerial platforms will require a stop somewhere within the operational command's white space. The operational command will need to physically manage this piece of terrain in its white space for as long as operational logistic operations require. Just as with an operational movement or maneuver that requires a long-term aerial platform interim support location, the necessity of managing this piece of terrain then drives the execution of tactical tasks to secure, maintain, and/or upgrade the terrain. Likewise, effectively managing this piece of terrain in the white space will require coordinating the capabilities of multiple assets for a lengthy period of time.

Aerial Logistics Delivery and the Operational Control Structure

The loss of sufficient aerial logistics delivery capability introduces several requirements to execute tactical tasks in the operational command's white space. First, tactical ground units must be integrated into the operational control structure to deliver logistical support to subordinate commands. As discussed this may require only adding these forces to an existing, local control node or the creation of a node capable of controlling local ground transport operations. Second, the terrain itself within the white space may require reshaping not just to support the transit of ground capabilities but more importantly to maximize the effectiveness of repeated logistical use. Third, security concerns along ground logistic routes may generate tactical tasks to secure these areas either permanently or for transitory periods. Last, the loss of the ability of aerial platforms to reach between subordinate commands may introduce the need to establish an intermediate resupply base between subordinate commands in the operational white space. Therefore it is proven that a change in the initial conditions of the capability to conduct

aerial logistics delivery requires the operational control structure to execute tactical tasks within its white space in order to continue conducting operational logistical and personnel support. If these tactical tasks generate inefficiencies in the operational control structure then that requires the operational control structure to change.

As noted earlier, the principal difference in addressing the loss of aerial transport capability to conduct operational movement / maneuver and the loss of aerial logistical delivery capability is the expectation of persistent use of the same area(s) of terrain in the operational white space. With a loss of an aerial transport capability, the white space terrain becomes an issue only for as long as it takes to complete the operational movement or maneuver through that area. The replacement of an aerial transport capability with ground platforms generates a requirement to utilize a portion of the white space terrain for a more indefinite period. In effect, the operational command structure assumes a focus upon a section, or sections, of its area of operations, perhaps at the detriment to the operational area of operation as a whole. This was a problem in both Afghanistan and Iraq where the operational headquarters' staff was consumed in controlling tactical units while attempting to manage overall operational requirements. The ad hoc nature of accomplishing terrain-shaping tactical tasks in the white space resulted in capabilities being assembled to accomplish operational requirements without clear chains of command being established, particularly before the CJTF was stood up. This created violations of the principles of both unity of command and unit integrity as the capabilities assembled sorted out for themselves a means of maintaining logistical support while accomplishing their independent missions. Simultaneously, this situation violates the principle of span of control as the operational control node attempts to execute the wide variety of tactical tasks necessary to utilize a piece of terrain for an indefinite period while executing operational logistical and personnel support. Lastly, a shift to ground delivery assets will create structural barriers between those who collect information and those who must use that information along the operational white space logistics routes. This is also because of the ad hoc nature of operationally conducting

a variety of tactical tasks within the same area over a period of time. Without a tactical control node that has responsibility for that piece of terrain, coordinating actions will generate conflicting perceptions and prioritization as multiple staff sections attempt to simultaneously replicate the function of a subordinate tactical commander. So far then, changing the initial conditions of aerial logistics delivery drives the greatest requirement to create tactical tasks within the operational white space. In turn, the scope of tasks required and the repeated necessity to use the same areas of operational white space terrain significantly reduces the effectiveness of the operational control structure and thus necessitates a change to that structure.

CONTRACT FOR LOGISTIC DELIVERY

The ability to contract the delivery of logistical support is the second identified capability that allows an operational command to conduct operational logistics and personnel support without organizing a control structure capable of executing tactical tasks within its white space. As described earlier, this enables the operational control structure to pass the requirement to execute tactical tasks in its white space to an outside agency. The initial condition is simply that the contracted agent accomplishes its delivery task. Therefore, the change to this condition is that the contracted agent becomes unable to deliver the required operational logistics support through the operational white space to subordinate commands. The reason this occurs is irrelevant – subordinate commands will still require their sustainment. The result of the loss of contracted capability, assuming that another contractor can't accomplish the task, is that the operational command must now augment, or in worst case, replace the contracted support with military assets that must now regularly transit the operational white space between commands. The scope and the scale of the impact of this situation parallels that of a loss of operational aerial transport delivery capability. In both situations, areas of white space terrain become a concern for the operational control node for an extended period of time. Similar tactical tasks are going to arise in this situation and thus the same reductions to the effectiveness of the operational control node

will develop. Thus, the loss of an operational contractor's ability to deliver logistical support through the white space to subordinate commands will result in a need to change the operational control structure.

QUICKLY NEUTRALIZE OPERATIONAL HAZARDS AND MINE THREATS

Being able to quickly neutralize operational hazards and mine threats is the identified capability that allows an operational command to provide a part of operational force protection without organizing a control structure capable of executing tactical tasks within its white space. Two initial conditions were identified that define how this ability to quickly neutralize operational hazards and mine threats overcomes the challenges of the terrain between subordinate commands. These conditions were (1) a capable and trained group is available to address the situation, and (2) the physical scope of the problem lends itself to rapid resolution. How changes in each condition may generate changes to the operational control structure is examined next.

Unlike the previous conditions that were degraded from an effective starting level, the two conditions associated with being able to quickly neutralize operational hazards and mine threats will be examined in their opposite manifestation. That is, the starting condition is that an operational control node does not initially have trained and capable groups under its control and must integrate them into its structure. This is considered a valid approach for two reasons. First, while the U.S. military has some capability to conduct area demining and mitigate the effects of significant environmental hazards, it relies heavily upon national non-military technical assets and the international community to augment its capabilities. Mobilizing and deploying this support takes time and these capabilities often flow into an area after the operational command is in place. Second, while many environmental hazards may be foreseen and thus capabilities integrated into the operational control structure prior to its deployment, others will emerge as a result of changing conditions within the operational area of responsibility. For example, while clearing mines and unexploded ordnance in the vicinity of Afghanistan's Bagram airbase was

foreseen, the requirement to use CJTF assets to clear large areas across the country for use as training sites for the developing Afghan National Army was not envisioned. The first tactical task was integrated with a collocated subordinate command; the second required the operational control node to execute a series of tactical tasks in its white space to execute the required force protection mission successfully. Similarly, the discovery of radioactive components of hospital equipment required the operational command to formulate a response to remove this environmental threat. This specific occurrence also happened to transpire in a subordinate command's area of operation but required operational assets to safely resolve. However, it is not unreasonable to envision this scenario happening in multiple locations, and thus in the operational white space, of a future area of operations encompassing a country more-developed than Afghanistan.

The time required to mobilize and to deploy technical assets coupled with the later emergence of operational hazards and mine threats often drives a requirement for the operational control structure to integrate technical capabilities after operations have begun rather than deploying with them. These assets generally bring very little in terms of organic sustainment capability and their technical equipment often requires acquiring repair and expendable item support from outside of the standard military procurement system. This translates into a higher amount of a commander's attention being focused on maintaining the capabilities of these units. Traditionally this challenge has been resolved by assigning these technical teams to functional operational control nodes that had a spatial alignment with the operational rear area and that provided these capabilities their logistic support. In non-contiguous operations though this area is eliminated and theoretically then also the need for those functional control nodes. The problem then becomes who to assign these small, technically capable units to when an operational hazard is identified. This problem spans the range of capabilities doctrinally contained under the tasks of operational force protection. A recent example illustrates this point. During Operation Iraqi Freedom, operational chemical units were deployed to provide a very technical force protection

capability. Because the operational control structure lacked a sub-ordinate control node capable of commanding and controlling this unit, the chemical unit was technically placed under the CFLCC commander. In reality this unit was "taken care of" by a staff officer in the C3 cell who became the chemical unit commander's point of contact for both guidance and logistical support.[45] Similarly, the CFLCC Forward Engineer cell spent part of its time tracking down repair parts for mine clearance equipment being used in Afghanistan. The plugging of operational capabilities into the operational control node staff sections, as opposed to into operational functional control nodes, was a common problem in the operations during both Afghanistan and Iraq where flattened command and control structures attempted to integrate strategic and operational capabilities into a control structure optimized for non-contiguous operations. While this ad hoc approach to the operational control structure might be feasible for short term, rapid decisive operations, when these capabilities are required for an extended period of time ad hoc structuring fails. This is where the size of the hazard itself enters as a condition upon which rests an operational command's ability to overcome the challenges of the terrain in its white space. For a force protection threat limited in physical area and essential neutralization measures, an operational command can integrate a small team and resolve the problem. The requirement to remove a radioactive component of a piece of hospital equipment discussed earlier resembles this type of easily resolved operational hazard. This solution still violates the doctrinal tenets of an effective control organization, but given the disruptive impact of reorganizing an operational control structure it may be the more acceptable solution. Conversely, an operational hazard or mine threat of a significant physical magnitude will require an extended period to

[45] This example is one of several identified during discussions with LTC John L. Garrett, who served as the Director for this monograph. LTC Garrett previously served as the S-3 for the 2d Bde, 1st Cavalry Division which was a separate brigade attached directly to CFLCC Headquarters in Kuwait during Operation Enduring Freedom. In LTC Garrett's unit's case, the official chain of command ran directly from a LTG to a COL.

neutralize. This is the more realistic scenario when discussing environmental hazards or mine clearance operations. The increased time required to eliminate the threat to operational force protection drives a requirement to support and provide command and control for a long period to technical teams, often assembled ad hoc from various coalition partners. This problem is exponentially increased if the operational hazard exists outside of a subordinate command's area of responsibility. Then the operational control node must figure out how to enable the technical assets completion of their task in an area of white space terrain for an extended period of time. Without an operational functional control node in place, this forces elements of the operational control node to replicate tactical control functions focused on a specific area of their white space while executing their overall operational force protection responsibilities.

Integrating the technical assets which provide force protection capabilities to resolve operational hazards and mine threats drives requirements to execute tactical tasks within the operational white space. If the nature of the hazard is such that a technical asset can be brought in and the hazard quickly neutralized then the problems integrating the technical asset resemble those associated with bringing a ground transport capability in to conduct an operational movement or maneuver through the white space. In both cases, the control structure's span of control and unit integrity will be violated. However, the reduction in control structure effectiveness will be of a transitory nature and removed when the technical capability completes removing the hazard and leaves the area of operations. On the other hand, hazard neutralization operations that require a lengthy period of time to execute their tactical tasks will generate further ineffectiveness in the operational control node. Unity of command becomes an issue when technical capabilities are assigned to the operational commander on paper but then "taken care of" on a day-to-day basis by subordinate staff sections. This also fundamentally violates the operational commander's span of control. An already inherent problem with unit integrity is further exacerbated. Our current organization recognizes that specific capabilities are meant to be brought into an operational area of responsibility and that these capabilities are severely limited in

their organic sustainment and control capacity. This problem is currently resolved by plugging those capabilities into higher echelons of functional control specifically built to overcome the challenges associated with creating and maintaining unit integrity. Without these echelons in place, unit integrity may never be achieved since resolving the new technical assets needs becomes a daily exercise in ad hoc solutions implemented by an operational control node staff officer. Finally, integrating technical capabilities to resolve challenges created by operational hazards and mine threats degrades information distribution in a control structure designed for non-contiguous operations. One manifestation occurs when the commander-commander interface is replaced by a commander-higher staff-commander interface.

SUMMARY OF CAPABILITY-DRIVEN CONTROL STRUCTURE CHANGES

This chapter examined the effect of changing the starting conditions of the capabilities that enable an operational control structure to accomplish its doctrinal operational tasks in non-contiguous battlespace. Changing the initial conditions of all of the capabilities resulted in the generation of tactical tasks in the operational white space. However, only the tactical tasks generated by four of the five capabilities led to a reduction of the effectiveness of the control structure by violating one or more doctrinal principles of an effective command and control organization. These relationships are summarized in the chart below:

VARIABLE (CAPABILITY)	STARTING CONDITION(S)	CONTROL STRUCTURE EFFECTIVENESS CRITIERIA VIOLATED BY CHANGING STARTING CONDITION
Aerial Transport	1. Sufficient assets exist to conduct all required operational movements or maneuvers	Unit Integrity, Span of Control
	2. The transport platforms require no support locations between subordinate commands	Unity of Command, Unit Integrity, Span of Control, Information Distribution
Aerial Sensors	1. Sensors are effective enough to support continuous situational awareness in all of the types of terrain in the operational white space	None

Aerial Logistics Delivery	1. Sufficient assets exist to conduct all required logistical support	Unity of Command, Unit Integrity, Span of Control, Information Distribution
	2. Transport platforms require no support locations between subordinate commands	Unity of Command, Unit Integrity, Span of Control, Information Distribution
Contract for Logistic Delivery	1. Contracted support accomplishes its delivery task	Unity of Command, Unit Integrity, Span of Control, Information Distribution
Quickly Neutralize Operational Hazards and Mine Threats	1. Capable and trained group is available to address the situation	Unit Integrity, Span of Control
	2. The physical scope of the problem lends itself to rapid resolution	Unity of Command, Unit Integrity, Span of Control, Information Distribution

For four of these capabilities then, the generation of tactical tasks in the operational white space results in a decrease in the effectiveness of the operational control structure and thus a potential requirement to change that control structure. Only a potential requirement is generated because while changes in these capabilities' initial conditions may reduce the effectiveness of the control structure, other factors may cause the operational commander to decide not to adjust the control structure. Similarly, this monograph has not sought all of the conditions whose changes may generate tactical tasks in the operational white space or attempted to describe all of the manifestations of reduced effectiveness generated in the control structure. Where this monograph has injected some science into determining when the operational control structure of a non-contiguous operation should be changed, the art of command still plays its role in deciding if the control structure will be changed. Identifying that changing the initial conditions of four of the five capabilities does reduce the effectiveness of the control structure answers the thesis of this monograph - "What changing capabilities during non-contiguous operations indicate that the operational control structure should change?"

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

CONCLUSION

Michael Evans observed that "The demands of operational versatility are likely to place a premium on organizational change."[46] This context of this statement is directed at the current organization of American joint military capability yet it is equally applicable to the challenge facing an operational commander attempting to conduct non-contiguous operations with changing capabilities. "Reconciling operational versatility with organizational stability"[47] will remain an imperative for operational commands as they seek to execute tactical solutions to problems in areas of their battlespace which were previously considered empty – their operational white space. This monograph has not of attempted to dictate how an operational command should resolve this problem; even the limited variety of problems that generate tactical tasks in the operational white space examined here do not lend themselves to a singular control structure solution. Rather, this monograph has provided operational commanders and their staffs a means of recognizing that a problem with their control structure will develop if a set of capabilities that enable the conduct of non-contiguous operations are changed. Five capabilities that enable an operational command to conduct non-contiguous operations without requiring the execution of tactical tasks in its white space were examined. Four of these turned out to be capabilities that when changed generated a requirement to execute new tactical tasks in the operational white space. The four capabilities and their enabling operational tasks are: an aerial transport capability to conduct operational movement and maneuver; an aerial logistics delivery capability or the capability to contract for logistic delivery to conduct operational logistics and personnel support,

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[46] Evans, 8.

[47] Evans, 8.

and; a capability to quickly neutralize operational hazards and mine threats as a part of providing operational force protection.

RECOMMENDATION

A single recommendation emerges from this monograph. Some insight is now available as to what changes in operational capabilities lead to the requirement to conduct tactical tasks in the operational white space during non-contiguous operations. Further, by applying the doctrinal criteria for an effective control organization, this translates into what changes in operational capabilities reduce the effectiveness of the operational control structure. Commanders and their staffs can now define the criteria for an operational control structure transition point. As shown, these criteria are based upon easily observable changes in the availability of the capabilities being used to conduct non-contiguous operations. This allows for the integration of control structure changes into the operational campaign plan. Tracking the approach of this transition point, and executing the change to the operational control structure in a predetermined manner, reduces the friction associated with changing the operational control structure during an ongoing operation. In closing, it is recommended that operational planners conducting non-contiguous operations integrate the concept of an operational control structure transition point into their campaign plan and base the transition criteria upon changes to the capabilities that enable the conduct of operational tasks during non-contiguous operations.

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